

## **DETAILED ACTION**

### ***Allowable Subject Matter***

1. Claims 9-12, 14, 17 and 24-27 are allowed.

### ***Reasons for Allowance***

2. The prior art does not anticipate nor render obvious the combination set forth in the independent claims, and specifically does not disclose that “the header forming plate of each of the header tanks has a wall thickness  $T$ , the outward bulging portion of each header tank has a bulging height of  $H$ , and  $H/T$  is in the range of 0.5 to 1.5” (claim 9) or that “the header forming plate of each of the header tanks has a wall thickness  $T$ , the outward bulging portions of each header tank have a bulging height of  $H$ , and  $H/T$  is in the range of 1.0 to 2.0.” The closest prior art of record, Moreau (US Pub. No. 2002/0134538 A1) discloses the other limitations of the invention required by the claim, but not with respect to the ratio of the header tank wall thickness and the bulging height of each header such that either:  $H/T$  is in the range of 0.5 to 1.5; or that  $H/T$  is in the range of 1.0 to 2.0.

Although it is well known in the art to provide a header tank for a heat exchanger, wherein the header necessarily has a wall thickness and a height, there is no teaching in the prior art of record that would, reasonably and absent impermissible hindsight, motivate one of ordinary skill in the art to modify the teachings of the prior art to incorporate the specific ratio of  $H/T$  as claimed by applicant so that  $H/T$  is either in the specific range of 0.5-1.0 per independent claim 9, or in the range of 1.0-2.0 per independent claim 17. Furthermore, the ratio  $H/T$  is critical to the proper operation of the heat exchanger of the claimed invention. Regarding the heat exchanger embodiment claimed wherein  $H/T$  is from 0.5-1.0, if  $H/T$  is less than 0.5, the bulging

Art Unit: 3744

portions are small in the cross sectional area of the refrigerant channel, thereby resulting in an increased internal pressure loss and a greater likelihood of adversely affecting the efficiency of the cooler. If, on the other hand,  $H/T$  exceeds 1.5, the outer bulging portions will have a reduced wall thickness at their peripheral wall portions due to a wall thickness reduced caused by press work, thereby likely reducing the pressure resistant strength of the cooler apparatus. The same concerns are true, respectively, for the heat exchanger apparatus as claimed wherein the ratio  $H/T$  is in the specific range of 1.0-2.0.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JUSTIN LOFFREDO whose telephone number is (571) 270-7114. The examiner can normally be reached on M - F 7:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler and Frantz Jules can be reached on (571) 272-4834 and (571) 272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Art Unit: 3744

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Supervisory Patent Examiner, Art Unit 3744

/JL/  
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